

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU.

CALIFORNIA SECTION.

G. H. WILLSON, District Forecaster.

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GENERAL SUMMARY.

The weather of January, 1916, was the most remarkable experienced in California in many years. The monthly mean temperature for the State, 39.8°, or 6.0° below the normal, was the lowest recorded during 20 years, which is the length of the State record. At numerous stations the month was more than 10° colder than the average January. The month was uniformly cold throughout, due largely to the persistent cloudy skies. The periods of severest cold were those of January 1-2, 11-12, and 29-31, at which times frosts occurred in the interior valleys. The lowest temperature experienced in the State, that of -36° which occurred at Bridgeport on the 31st, is not often equalled.

The average precipitation for the State was 15.61 inches, or 10.20 inches above the normal. With the exception of January, 1909, this was the heaviest recorded during any month since State records were begun in 1897. In San Francisco the rainfall was the heaviest received during any month in the past half-century, and has been exceeded but twice in 66 years, which is the length of the record. In the State as a whole the amount was well distributed throughout the month, and most of it accompanied the storms of January 1-3, 13-19, and 26-29. These three storms were among the most severe experienced during recent years. The first of the three was confined principally to the central and north portions of the State, where it brought a generous rainfall. In the San Francisco Bay region the accompanying wind reached destructive velocities, and caused the loss of one life, in addition to doing considerable damage to property. The second storm, while accompanied by general precipitation throughout the entire State, was especially severe in the San Joaquin Valley, and also in southern California, where torrential rains occurred. At Squirrel Inn, in San Bernardino County, the 24-hour precipitation of January 16-17 was 16.81 inches, one of the heaviest for that interval of time ever recorded in the United States, and a new record for this State. These rains, augmented by the water from melting snow in the mountains, produced freshets in the smaller streams, which in several instances gave the highest stages ever recorded. Lowlands were inundated and serious damage to roads and bridges resulted. In the Tia Juana Valley alone three deaths occurred from the flood waters, and a number of villages were partially submerged. In the mountains additional loss of life resulted from exposure. Immediately following the downpour of rain a southwest gale wrought havoc with wires in the southern portion of the State. In the Kern County oil fields the high winds did tremendous damage to oil derricks, more than 400 of which were blown down in the Bakersfield district alone.

Before the southern part of the State had fully recovered from the effects of the second storm of the month, a third severe storm arrived on January 26th. This storm, which persisted until the 29th, was one of the most disastrous ever experienced in California. Like the second storm, the rainfall, while general, was heaviest in the central and southern portions of the State. The soil, already saturated by previous unprecedented rains, was unable to absorb more moisture, and wide-spread floods followed. Ranches were partially or wholly inundated, and various stream-beds, which usually carry but small rivulets, became raging torrents of water. The dam at Lower Otay, part of the San Diego water system, gave way on the evening of January 27th, and caused the loss of 17 lives, besides doing immense property damage. Violent gales followed, and a velocity of 104 miles per hour was recorded at Point Reyes on the 27th. Regardless of the fact that storm warnings were displayed, the

(Continued on page 6.)

PRESSURE.

The monthly mean atmospheric pressure for the State, reduced to sea-level, was 29.99 inches. The highest was 30.66 inches at Independence on the 31st. The lowest was 28.81 inches at Point Reyes on the 27th. The range for the State was 1.85 inches.

TEMPERATURE.

The monthly mean temperature for the State was 39.8 degrees, which is 6.0 degrees below the normal. The highest monthly mean was 55.0 degrees, at King City, and the lowest was 15.4 degrees, at Bridgeport. The highest temperature, 89 degrees, occurred at Blythe on the 22nd, and the lowest, -36 degrees, at Bridgeport on the 31st. The range for the State was 111 degrees.

PRECIPITATION.

The average precipitation for the State was 15.61 inches, or 10.20 inches above the normal. The greatest monthly amount was 50.29 inches, at Squirrel Inn, and the least monthly amount was 0.60 inch, at Sterling. The greatest amount in 24 hours was 16.81 inches at Squirrel Inn on January 16-17.

RELATIVE HUMIDITY.—(Per Cent.)

Stations.	5 a. m.	5 p. m.	Mean.
Eureka.....	90	81	86
Fresno.....	85	71	78
Los Angeles.....	89	78	84
Mount Tamalpais.....	93	94	94
Red Bluff.....	89	78	84
Sacramento.....	90	76	83
San Diego.....	88	76	82
San Francisco.....	88	74	81
San Jose.....	94	74	84
San Luis Obispo.....	91	79	85

SUNSHINE AND CLOUDINESS.

Stations.	Actual hours of sunshine.	Per cent. of the possible.
Eureka.....	118	40
Fresno.....	97	31
Los Angeles.....	129	41
Mount Tamalpais.....	52	17
Red Bluff.....	79	26
Sacramento.....	116	36
San Diego.....	152	48
San Francisco.....	65	21
San Jose.....	72	23
San Luis Obispo.....	94	30

WIND MOVEMENT.—(Miles.)

Stations.	Total movement for month.	Average hourly velocity.	Maximum velocity.	Direction.	Date.
Eureka.....	6,467	8.7	43	nw.	27
Fresno.....	4,887	6.6	52	sw.	27
Independence.....	3,991	5.4	48	sw.	27
Los Angeles.....	5,831	7.8	34	sw.	27
Mount Tamalpais.....	14,748	19.8	63	sw.	2
Point Reyes.....	17,351	23.3	104	nw.	27
Red Bluff.....	5,496	7.4	26	s.	8
Sacramento.....	7,746	10.4	50	se.	2
San Diego.....	6,399	8.6	54	s.	27
San Francisco.....	6,346	8.5	48	sw.	2
San Jose.....	6,411	8.6	46	se.	3
San Luis Obispo.....	3,257	4.4	25	w.	27

The prevailing direction of the wind for the State was south.

Climatological Data for January, 1916.

Table with columns: Stations, Counties, Elevation, Length of record, Temperature (Mean, Departure from normal, Highest, Date, Lowest, Date, Greatest daily range), Precipitation (Total, Departure from normal, Greatest in 24 hours, Snowfall, etc.), Number of days (Clear, Partly cloudy, Cloudy), Prevailing direction of wind, Observers.

Climatological Data for January, 1916.-Continued.

Table with columns: Stations, Counties, Elevation, Length of record, Temperature (Mean, Departure from normal, Highest, Date, Lowest, Date, Greatest daily range), Precipitation (Total, Departure from normal, Greatest in 24 hours, Snowfall, Precipitation of inch or more), Number of days (Clear, Partly cloudy, Cloudy), Prevailing direction of wind, Observers.

Climatological Data for January, 1916.—Continued.

Table with columns: Stations, Counties, Elevation, Length of record, Mean, Departure from normal, Highest, Date, Lowest, Date, Greatest daily range, Total, Departure from normal, Greatest in 24 hours, Snowfall, Precipitation of inch or more, Clear, Partly cloudy, Cloudy, Prevailing direction of wind, Observers.

The departures from the normal temperature and precipitation are computed only for such stations as have ten or more years of record, but all complete reports are used in determining section or division means.

* Temperature extremes are from observed readings of the dry bulb; means are computed from observed readings.

† Also on other dates.

T. Precipitation is less than 0.01 inch rain or melted snow.

a, b, c, etc., indicate respectively, 1, 2, 3, etc., days missing from the record.

Special Rainfall Stations in Los Angeles and San Bernardino Counties for January, 1916.

Table with columns: Stations, Day of Month (1-31), Total.

(Continued from page 3.)

steamer Aberdeen left San Francisco Bay on that day and was wrecked off the Golden Gate a few hours later. Eight lives were lost. In the San Joaquin Valley the highest wind velocities ever recorded there occurred on January 27th, and great damage again resulted in the oil fields.

In spite of the adverse climatic conditions experienced during January the agricultural interests did not suffer as greatly as might have been expected. Frosts occurring in January usually do little harm in this State, and such was the case this year.

times the normal rainfall. While the month was unfavorable agriculturally, it is believed that no permanent injury has been sustained.—A. H. P.

MISCELLANEOUS PHENOMENA.

Thunderstorms.—Auberry, 27; Bonita, 19; Branscomb, 10; Dudleys, Kinsley, La Jolla, 27; Los Plumas, 25; Lindsay, 5, 29; Peachland, 4; Point Loma, 19; St. Helena, 9; Three Rivers, 27; Upper Mattole, 30.

Earthquakes.—Cahuilla, 10; Claremont, Corona, 1; Peachland, 15; Rialto, 1.

COMPARATIVE DATA FOR JANUARY.

MEAN MONTHLY TEMPERATURE FOR THE STATE.

Table with columns: Year (1897-1906), Mean Monthly Temperature.

AVERAGE PRECIPITATION FOR THE STATE.

Table with columns: Year (1897-1906), Average Precipitation.

Daily Precipitation for January, 1916.

Table with columns for Stations, Day of Month (1-31), and Total. Rows list various California locations such as Abbotsville, Aguanga, Alturas, American Camp, etc., with their respective daily precipitation values.

Daily Precipitation for January, 1916.—Continued.

Main data table with columns for Stations, Day of Month (1-31), and Total. Rows list various locations like Porterville, Portola, Priest Valley, etc., with precipitation values for each day.

Except as otherwise indicated observations are generally made late in the afternoon, near sunset, and precipitation recorded is for the 24 hours ending at the time of observation. *** Regular Weather Bureau station; precipitation is for the 24-hour period, midnight to midnight. ††† Precipitation measured in the morning; amount then recorded is for the preceding 24 hours. * Precipitation included in the next following measurement. † Separate dates of fall not recorded. T, Trace, or less than 0.01 inch.

DELAYED REPORTS.

Table with columns for Stations, Month, Temperature (Mean, Max., Date, Min., Date), and Total precipitation. Rows include Berkeley, Bowman's Dam, Chester, San Miguel Island.

ERRATA. DECEMBER, 1915.

San Francisco, page 143, actual hours of sunshine 296, should be 138. San Luis Obispo, page 143, actual hours of sunshine 110, should be 172. Per cent. of possible 66, should be 56. Paso Robles, pages 145 and 149, precipitation total is deficient, and the correct total is unavailable. NOTE:—Beginning with this issue the stations heretofore published under the names Arbolado and Mammoth Tank will appear as Big Sur and Sterling, respectively.

Daily Temperature for January, 1916.

Table with columns for Stations, 1-31, and Mean. Rows list various California locations such as Alturas, Bakersfield, Barstow, etc., with their corresponding temperature data for each day of the month.

Snowfall Data. [In inches.]

SNOWFALL IN THE MOUNTAINS.

WATERSHED, COUNTY, STATION.	Total snowfall.	Water equivalent.	Am't on ground 15th.	Am't on ground 31st.	Compr'd with normal.
Klamath Watershed.					
<i>Siskiyou County.</i>					
Yreka	33		11	4	-17
<i>Trinity County.</i>					
Hayfork	77		29	23	
Ruth	103		39	18	
<i>Humboldt County.</i>					
Weitchpec	68		34	8	+51
Mountain Lakes.					
<i>Modoc County.</i>					
Cedarville	52		18	5	+37
Fort Bidwell	53		24	18	
<i>Lassen County.</i>					
Eagle Lake	74		44	38	+21
Fredonia					
Madeline	80		36	30	+58
Susanville	107			32	+79
<i>Tehama County.</i>					
Mineral					
<i>Nevada County.</i>					
Boca	216		55	60	+147
Truckee	143		60	84	+100
<i>Inyo County.</i>					
Bishop Creek	91		43	55	+39
Lone Pine	48		2	6	
Wells Meadow	97		25	46	
Sacramento Watershed.					
<i>Siskiyou County.</i>					
Dunsmuir					
McCloud	154		66	55	+92
Sisson	150		45	38	+118
<i>Modoc County.</i>					
Alturas	38		15	10	+24
<i>Shasta County.</i>					
Burney	85		44	32	+60
<i>Plumas County.</i>					
Bucks	233		175	216	
Canon Dam	97		73	68	+66
Chester	140		65	63	
Clover Valley	141		60	62	+87
La Porte	149		97	120	+86
Portola	112		60	51	
Quincy	133		45	52	+104
<i>Butte County.</i>					
De Sabla	105		30	27	+87
Inskip	212		101	120	+134
Stirling City	72				+40
West Branch	136		52	56	+90
<i>Yuba County.</i>					
Camptonville	129		53	40	+97
<i>Sierra County.</i>					
Bunker Hill					
Dorsey's					
Downieville	110		38	48	+75
Sierra City	159		78	69	+86
Sierraville	111		40	49	+61
Table Rock	278		156	190	+181
<i>Nevada County.</i>					
Bowman's Dam					
Deer Creek	189		76	60	+135
Fordyce Dam	262		140	161	+164
Lake Spaulding	226		118	138	+168
<i>Placer County.</i>					
Blue Canon	228		118	134	+174
Cisco	261		163	180	+186
Emigrant Gap	210		125	142	+156
Summit	255		178	215	+176
San Joaquin Watershed.					
<i>Alpine County.</i>					
Tamarack	192		158	203	+5
<i>Tuolumne County.</i>					
Center Ranger Station					
Hetch Hetchy	29		8	11	+18
Lake Eleanor	92		42	56	+41
<i>Mariposa County.</i>					
Yosemite	94		32	46	+55
<i>Fresno County.</i>					
Cascada	72		22	32	
Hume					
Huntington Lake	118		66	96	
<i>Tulare County.</i>					
Hot Springs	22				+20
Springville	84				+69
Mountains of Southern California.					
Bear Valley Dam	36		4	30	+9
Converse Nursery	46		3	6	
Holcomb	80		22	36	+59
Squirrel Inn	41		20	27	+32
Seven Oaks	36				+22
Nellie	21		0	6	
Julian	15		7	1	

Unlike the preceding month, the snowfall in the mountains during January, 1916, was heavy throughout the state of California. While only a fraction of the usual amount covered the ground at the end of December, the snow on the ground at the end of January was the heaviest in years. Just as the precipitation for the State as a whole was excessive, so the snowfall in the elevated regions was abnormally heavy. Most of the snow was brought by the storms of January 1-3, 13-19, and 26-29, all three of which were especially severe. Railroad blockades were the unavoidable results of all of these storms. The persistent low temperature, partially due to the absence of sunshine, conserved the snow in the mountains, though the warm rain accompanying the storm of January 13-19 melted considerable snow in the mountains adjacent to the San Joaquin Valley, and in the mountains in southern California. Owing to the low temperatures prevailing throughout the month a portion of the precipitation in the interior valleys and even along the coast was in the form of snow. Three times during the month the hills in the San Francisco Bay region were snow-covered. In the Sierra Nevada Mountains enormous deposits of snow accumulated during the month, and little was lost due to melting. A snow survey made by the Southern Pacific Company between January 24 and 27 gave the following results:

Andover: Depth on ground 120 inches; weight per cubic foot, 1st foot 7 pounds, 3rd 19, 5th 21, bottom 23.

Blue Canon: Depth on ground 70 inches; weight per cubic foot, 1st foot 21 pounds, 3rd 23, bottom 25.

Boca: Depth on ground 48 inches; weight per cubic foot, 1st foot 8 pounds, center 21, bottom 23.

Cisco: Depth on ground 114 inches; weight per cubic foot, 1st foot 19 pounds, 3rd 22, 6th 25, bottom 26.

Colfax: Depth on ground 6 inches; weight per cubic foot, 22 pounds.

Summit: Depth on ground 168 inches; weight per cubic foot, 1st foot 10 pounds, 3rd 14, 6th 18, 10th 22, bottom 28.

Truckee: Depth on ground 96 inches; weight per cubic foot, 1st foot 9 pounds, 3rd 19, 5th 21, bottom 23.

Bearing in mind the fact that 1 cubic foot of water weighs 62 pounds, and that 1 cubic foot of ice weighs 57 pounds, it is apparent that the snow is well packed. Throughout the State a more than ample amount of water for irrigation and power purposes is already assured for the coming summer. — A. H. P.

COMPARATIVE SNOWFALL DATA FOR JANUARY.

(Amount on the Ground.)

	FORDYCE DAM.			SUMMIT.			TAMARACK.		
	1st.	15th.	31st.	1st.	15th.	31st.	1st.	15th.	31st.
1907	58	106	94	45	142	148	125	175	180
1908	69	63	68	87	72	87	75	94	104
1909	25	68	107	28	90	172	35	150	190
1910	60	78	87	54	87	68	72	96	106
1911	0	99	124	4	136	218	24	130	310
1912	49	39	59	60	46	41	44	50	55
1913	28	73	78	17	79	88	40	98	118
1914	63	95	107	80	132	192	116	178	274
1915	30	59	67	24	56	80	26	50	116
1916	54	140	161	44	178	215	62	158	208